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The most interesting of the chapters is the one which presents the dynamics of the heath formation. Graebner combats with great vigor the rather common view that heaths represent areas once forested, in which reforestation has been prevented directly or indirectly through the agency of man. He argues that most heath areas show no tendency to return to forests, when left quite free to do so, and that in many cases heaths even encroach upon forests. As already noted, the chemical nature of the soil is believed to be inimical to tree growth, and the *Ortstein* of the heath subsoil adds to the difficulty. The author departs from most commonly accepted views in regarding the climate as fundamentally responsible for the condition of these heathy soils. The most usual origin of the heath is from forests in which the soil has been made gradually poorer in necessary salts, partly by the trees themselves but more especially by leaching. The latter process is thought to be greater in northwestern than in northeastern Germany, because of greater rainfall. Hence the heath prevails westward under original soil conditions that bring forth forests eastward. The heath may originate on naked sand through a series of stages, the first of which is characterized largely by algae and moss protonemata. Graebner also shows how heath moors may originate, giving three cases: development from water, from naked soil, and from forests. The heath may develop from these moors, if for any reason they become dry. Sections are devoted to the soil species and climatic features of the heath region.

The second part of the book treats of the various types of heaths, which the author divides into four groups. (1) Heaths proper, including Calluna, Tetralix, Empetrum, and Sarothamnus heaths; (2) grass heaths, dominated by xerophytic grasses; (3) forest heaths, mostly dominated by pines; (4) Weingaertneria heaths. The final section deals with the relation of the heath to other formations. This volume is easily the most readable of those which have been thus far published, and it is to be hoped that other volumes which deal with definite formations will follow soon.— H. C. COWLES.

Vegetation pictures.

KARSTEN and SCHENCK[3] have inaugurated a valuable series of illustrations of the world's vegetation, of which two numbers have thus far appeared. Each number contains six excellent heliotypes, representing characteristic plant formations in various parts of the world. Full descriptive text accompanies each picture, so that reference to various original monographs is scarcely necessary. The first number, prepared by Schenck, deals with southern Brazil, presenting views of the tropical rainy forest, myrmecophilous trees, palms, epiphytes, and Araucaria woods. Karsten has given out the second number, which contains views from the Malay archipelago, presenting the Nipa formation, tree ferns, rainy forest and street scenes. The illustrations are usually well executed and will prove of great value in botanical classes.

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[3] KARSTEN, G., and SCHENCK, H., Vegetationsbilder. 4to. Jena: Gustav Fischer. 1903. Subskriptionspreis jedes Heft von 6 Tafeln *M* 2.50. Einzelne Hefte *M* 4.

The vegetation of east Africa, so long poorly known, but now so fully brought to light by the work of Dr. Engler and his associates, is presented yet more clearly by an excellent series of 64 reproductions from photographs, taken by Walther Goetze, who lost his life while engaged in this work.[4] Among the views here presented are coastal steppes, high grass steppes, Acacia and other tree steppes, palm woods, Euphorbia thickets, alluvial forests, mountain woods and thickets, mountain meadows, rainy forests, etc. Good text descriptions accompany the views, and it is safe to say that one may get from a careful study of this work a vivid and true picture of many of the plant formations of German East Africa.—H. C. COWLES.

MINOR NOTICES.

A. J. MCCLATCHIE[5] has brought together a large amount of interesting information concerning Eucalyptus. The purpose of the bulletin is to give information concerning the characteristics of the "eucalypts," their climatic requirements, and their uses; to give directions and suggestions as to their propagation and culture; and to furnish a means of identifying seedlings and mature trees. It seems that these trees now serve very many useful purposes in the Southwest, and give promise of great future usefulness in the semi-arid portions of our continent. The covering of the now untillable treeless portions of the semi-tropic section of America with such trees as eucalypts, which will yield fuel, timber, and other useful products, and also furnish protection from the sun, from winds, and from floods, or otherwise ameliorate existing climatic conditions, is certainly an achievement greatly to be desired. The characteristics of forty-one species, being the principal ones grown in America, are discussed, and illustrated by the ninety-one handsome reproductions of photographs.—J. M. C.

HILDEBRAND[6] has published under the title *Aehnlichkeiten im Pflanzenreich*, a volume rather out of the ordinary in the nature of its contents. The material presented is familiar to botanists, and yet would not particularly attract the popular reader. The stock cases of similarity in general habit, and in various organs (such as cacti and euphorbias, leaves and phylloclades, raspberries and mulberries, chestnuts and horse chestnuts) are mar-

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[4] ENGLER and GOETZE, Vegetationsansichten aus Deutschostafrika inbesondere aus der Khutusteppe, dem Ulugurugebirge, Uhehe, dem Kingagebirge, vom Ruogwe, dem Kondeland und der Rukwasteppe, nach 64 von Walther Goetze auf der Nyassa-See und Kinga-Gebirgs-Expedition der Hermann und Elise geb. Heckmann Wentzel-Stiftung hergestellten photographischen Aufnahmen.

[5] MCCLATCHIE, A. J., Eucalypts cultivated in the United States. U. S. Dept. of Agric., Bureau of Forestry, Bull. 35. pp. 106. *pls. 91.* 1902.

[6] HILDEBRAND, F., Ueber Aehnlichkeiten im Pflanzenreich. 8vo. pp. iv+66 Leipzig: Wilhelm Engelmann. 1902. Price *M* 1.60.